Epidemiology and control of peste des petits ruminants (ECo-PPR) inception workshop for West Africa

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ILRI WORKSHOP REPORT


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Background

The peste des petit ruminants (PPR) global control and eradication strategy was endorsed in April 2015 by more than 200 countries with the vision of a PPR-free world by 2030. The members of the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE), through resolutions of their governing bodies, confirmed their commitment to this initiative.

The International Livestock Research Institute (ILRI) has received funding from the European Commission (EC) through the International Fund for Agricultural Development (IFAD) to implement a research project in support of ongoing global PPR control and eradication efforts. The project 'Epidemiology and control of peste des petits ruminants (ECo-PPR)' is implemented in three countries in East Africa (Ethiopia, Kenya and Tanzania) and West Africa (Mali, Burkina Faso and Senegal). The goal of the project is to conduct research that addresses key knowledge gaps to support the ongoing PPR control and eradication efforts in Africa. The project is envisaged to specifically generate evidence to support surveillance and control activities in selected countries in areas that are known to be difficult to reach during vaccination campaigns. In the target countries, the target groups consist of livestock keepers, stakeholders involved in animal health service delivery (professionals and paraprofessionals), and government actors. The project closely coordinates activities with other PPR projects to generate meaningful synergies and avoid duplication.

The project is organised into four components:

1 Epidemiology and socioeconomic impact to fill existing knowledge gaps

2 Modelling PPR control to assess effectiveness of different control scenarios

3 Vaccine delivery and diagnostics to improve access to vaccines by livestock keepers

4 Capacity development and surveillance to provide an adequate enabling environment for control efforts

To kick start the project activities in West Africa, an inception workshop was organized from 25–27 June 2019 in Ouagadougou, Burkina Faso. This report documents the process and different activities validated by stakeholders and highlights possible synergies with similar existing research and development projects in West Africa.

Overall objective of the workshop

The overall objective of the workshop was to review the status of PPR research in West Africa in consultation with key stakeholders and validate the project's research activities.

Objectives of the workshop

The objectives of the workshop were to:

- review current situations on PPR research in West Africa.
- inform key small ruminant value chain stakeholders about the objectives of the project and review suggested activities in a participatory manner.
- discuss and agree specific work packages and implementation plans with implementing partners (2019–2021).
- explore opportunities for collaboration with ongoing initiatives on PPR control in the region.

Procedure

The meetings brought together scientists from ILRI and Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD); regional research centres such as Centre International de Recherche-Développement sur l'Elevage en Zone Subhumide (CIRDES); regional PPR development projects in West Africa such as Projet Régional d'Appui au Patoralisme du Sahel (PRAPS) and Projet d'Appui and Développement de l'Elevage (PADEL) in Burkina Faso; National Research Institutes such as Institut Sénégalais de Recherche Agricoles (ISRA) and Laboratoire Central Vétérinaire (LCV), NGOS such as Vétérinaire Sans Frontières, Belgium; public veterinary services of respective countries (Senegal, Burkina Faso and Mali); representatives of the Economic Community of West African States (ECOWAS) and Food and Agriculture Organization (FAO). The workshop was carried out for three days and consisted of meeting with implementing partners (two days) and stakeholders (one day).

Day 1, 25 June 2019: Meeting with project implementing partners

On the first day, the core research teams consisting of ILRI, CIRAD, ISRA, LCV and CIRDES agreed on the rough outline of research activities to be validated with stakeholders during the launching workshop (day 2). The activities are developed around the four pillars of the project:

Pillar 1: Epidemiology and economics of PPR

- Animal experimentation for providing information on how the virus spreads
- Network analysis and socioeconomic impacts (including gender) at community and regional levels
- Characterization of PPR virus (PPRV) strains circulating in the region

Pillar 2: Modeling options for PPR control and risk mapping

- Participatory modeling of disease transmission and control in cross-border areas
- Evaluation of control scenarios
- Development and validation of risk maps with actors involved in the project.
- Test and validation of control options with stakeholder

Pillar 3: Vaccines and diagnostic

- Studies on willingness to vaccine (WTV) and willingness to pay for vaccination (WTP)
- Costing framework for PPR vaccines
- Evaluation of cold chains
- Ways to increase participation of farmers in vaccination
    - ICT based approaches (SMS/interactive voice recording)
    - Participation of women to vaccination

Pillar 4: Capacity building

- Provide the necessary enabling environment
- Align activities with the proposed activities under pillars 1–3

Photo 1: ILRI team and research partners (CIRAD, LCV, ISRA and CIRDES)

Day 2, 26 June 2019: Meeting with stakeholders

On the second day a range of stakeholders including ECOWAS, FAO, PRAPS, PADEL, Vétérinaires Sans Frontières, Belgium, public veterinary services of respective countries and private veterinarians consulted on research gaps and priorities in West Africa. During the meeting, a series of presentations and discussions were held. After the welcoming address by Augustine Ayantunde, ILRI representative in West Africa, workshop participants introduced themselves and expressed their expectations from the meeting. Participants said they hoped to get better knowledge of the epidemiology of PPR and molecular epidemiology of PPRV; mapping and modelling of PPR in West Africa; and socioeconomics, action synergies, operationalization and collaboration between research and development.

Photo 2: Welcoming address by Augustine Ayantunde, ILRI representative in West Africa

The first presentation was by Barbara Wieland, the project Principal Investigator from ILRI. She shared the project's main objectives, suggested activities as agreed with the core research team (see above) and outlined expected outputs and theory of change.

The main objectives of the project are to:

- develop PPR risk models and maps and predict success of control in different settings to support evidence based decision making at policy level.
- validate diagnostic tests and vaccines and support their scaling up through improved business models for vaccine delivery to reach livestock producers.

The project's outputs are as follow:

- development of disease spread models to inform PPR control
- validation of vaccine and diagnostic tools and delivery models
- capacity building in surveillance of national stakeholders especially institution in charge of livestock and disease control

These will lead to outcomes such as support to PPR control and eradication both at local and global levels, and support to the increase of small ruminants production; thereby, contributing to food security and the fight against hunger and poverty.

The second presentation was given by Adama Diallo, a researcher at CIRAD. The presentation focused on the history of molecular epidemiology and distribution of PPRV lineages in West Africa. PPRV strains that have been identified so far are grouped into four lineages. Initially, each lineage was specific to a particular region: lineage I in West Africa excluding Ghana, Benin and Nigeria; lineage II in Ghana, Benin, Nigeria and Central Africa; lineage III in East Africa; and lineage IV in the Middle East and Asia. However, further studies have shown that this initial geographical distribution of PPRV lineages in Africa, and in particular in West Africa, is not static as it is subject to change. For example. lineage I has nearly disappeared while lineages II and IV are in constant expansion. In addition, more than one lineage can be present in a country.

The most striking feature in geographical distribution of PPRV lineages is the invasive aspect of PPRV lineage IV that was initially found only in Asia and the Middle East, which was then detected in northern Africa and has now spread to East, Central and West Africa. These trends seem to follow livestock trade routes. This situation has raised the question of the role of internal and cross-border mobility of small ruminants in the propagation of PPR lineages, which highlights the need to better understand the situation in areas with significant cross-border movement as there is currently lack of evidence on how cross-border movements affect distribution of PPRV lineages. Such insights will ideally be complemented by social network analysis and studies on mobility of small ruminants in the region. Adama reminded participants that there is also a need for more comprehensive studies on the pathogenicity of the different PPR strains circulating in West Africa as well as the biological advantage of different lineages as this may affect their spread.

The third presentation was given by Idriss Alfaroukh, coordinator of the animal health component of PRAPS. PRAPS is a development program funded by the World Bank to help improve access to critical production assets, services and markets for pastoralists and agropastoralists in selected transboundary areas and along transhumance routes in the six Sahel countries—Burkina Faso, Mali, Mauritania, Niger, Senegal and Cha—and improve the capacity of these countries to respond in time and effectively in case of pastoral crises or emergencies. In that program, PPR and contagious bovine pleuropneumonia are the two diseases targeted in the program for control in the six countries. The control interventions are informed by the OIE Performance of Veterinary Services (PVS) and they mainly focus on livestock vaccination and capacity development of veterinary services.

The project has generated many positive outputs among which are the significant increase in vaccination coverage in specific countries. However, there are still pending constraints to be overcome, especially:

- rebuilding trust between farmers and veterinary services in the field. Lack of trust translates into farmers not showing up for vaccination of their animals or high rate of self-medication.
- the issue of "refusal to vaccinate" was discussed. In the opinion of the experts, this is not a deliberate choice of farmers but comes from ignorance about the benefits of vaccination. This brings back the question sensitisation of the farmers.
- the need to introduce animal identification in vaccination programs to help avoid multiple vaccinations of the same animal. Single effective vaccination provides sheep and goats immunity for at least 3–5 years and probably lifelong.
- low level of appropriation of received training by government officers and lack of follow up to assess impact made.
- lack of reliable statistics in livestock, a key challenge hindering accurate estimation in vaccination coverage, misleading conclusions made in this regard.

Based on lessons learnt from the PRAPS activities implemented so far, Alfaroukh made the following recommendations:

- More awareness raising activities are needed about the objectives of vaccination and involvement of farmers in the vaccination programs.

- The capacity of veterinary services need to be strengthened.
- More human resources is needed in livestock health in specific countries.
- Increase funding by government or development partners in livestock health, especially in pastoral systems.
- Invest in the improvement of the livelihood and socioeconomic development of pastoral populations.
- Support regional approaches in the control of major animal diseases such as PPR.

Overall, there is need for involvement and commitment of public authorities and decision-makers to support the control and eradication of PPR. According to the presenter, the research outputs from the Eco-PPR project will be fundamental in helping improve current interventions.

Group session (bus stop)

The objective of this session was to discuss the suggested project activities with stakeholders in detail. Three group sessions were organised into bus stops to allow participants to review and suggest new research areas that they consider critical and of priority. The groups were mixed across countries to capture ideas from a regional perspective. The stations were:

- Station 1: Disease modelling and risk mapping
- Moderators of the station: Andréa Apolloni and Raphael Duboz
- Station 2: Epidemiology, diagnosis and socioeconomics
- Moderator of the station: Barbara Wieland
- Station 3: Vaccine production, availability and accessibility
- Moderators of the station: Michel Dione and Abdrahmane Wane

At each station, the following questions were discussed:

- Question 1: Based on introductory presentations and your experience on PPR, what are areas of research that have never or not sufficiently been addressed and which merit attention of the project?
- Question 2: What are the research activities around gender and disease to better inform research in the area?
- Question 3: What other projects do you know that are conducting activities with PPR orientation and what kind of relations should we have with them?

Photo 3 and 4: Bus stop discussion sessions

At the end of the sessions, feedback was received by each group (Table 1). The key aspects that have come up from the discussion are: the need for generating evidence-based data on the epidemiology of PPR in west Africa, importance of addressing genders gaps in the delivery of vaccines and creation of synergies and options for collaboration with ongoing development and research projects in the region.

Table 1: Bus stop group discussions

Questions	Station 1: Disease modelling and risk mapping	Station 2: Epidemiology, diagnostics and socioeconomics	Station 3: Vaccine production and delivery
What are areas of research that have never or not sufficiently been addressed and which merit attention of the project?	How does disease (modelling disease spread)? Geographic factors: access to pasture, seasons, cover, markets, geographic distribution of PPR Inventory of existing and accessible data on livestock and disease control How to ensure good quality of epidemiological data Generate knowledge about the PPR virus (infectiousness and pathogenicity) Generate data on livestock mobility and production systems Availability of information about individual national PPR control strategies Veterinary structures and services How to coordinate PPR control strategy and reality in the field Evaluate economic losses related to PPR on household and national levels develop prediction, onset of illness models economics of livestock keeping	Update the distribution and genotyping of PPRV strains Pathogenesis of strains (modelling) to inform in disease modelling Epidemiology: performing an east-west/north-south transect vs target strategic areas Costs of vaccination strategies (who pays?) Impact of diseases (socioeconomics) Value chain analysis (production and marketing and risk points) Use of rapid diagnostic tests Mobility (risk for targeted vaccination) Popularization with farmers and sensitisation of decision-makers Epidemic: project Capacity building of national research institutions in PPR diagnostic	Possibility of optimizing existing thermotolerant vaccines and development of polyvalent vaccines to tackle other important diseases as well Support accreditation of national laboratories Packaging in smaller doses to avoid waste (50 doses vs 100 doses) How to build trust between farmers and health service providers What are the real causes of vaccination failure? Revisit the vaccine production circuit and assess the status of cold chains Investigate why the current information dissemination channels are not working and test new approaches to sensitisation and awareness raising of farmers (musical spots, media, markets) Strategies for increasing human resources and capacities: availability of public and private veterinary services Country-level vaccine production—strengthening equipment Test models such as combination of vaccination with deworming campaings Identify who is the key player within the household (husband, wife, children) to better target vaccination messages Investigate the cost of vaccines and vaccination Pilot test prefabricated rooms for vaccine storage
What are the research activities around gender and disease to better inform research in the area?	How to better involve women in decision making in vaccination What is the share of women in the labor allocation in small ruminant management	Impact of diseases (socioeconomics)	How to better involve women in the decision-making process in vaccination How to better target women in awareness campaings about vaccination
What other projects do you know that are conducting activities with PPR orientation and what kind of relations should we have with them?	PRAPS, PADEL, REDISSE (diagnostic, epidemiology, surveillance)		PRAPS, Feed The Future Mali Livestock Scaling Technology Program (FtF MLSTP), Comité International de la Croix Rouge (CICR); PADEL, PASA-LOUMAKAF (Sénégal), FAO

Group discussion per country

The objective of this session was to discuss specific country needs and plans. Table 2 summarizes the results of the session.

Table 2: Priority activities suggested by country

Theme/country	Epidemiology and diagnostic	Disease modelling	Vaccine	Capacity development
Senegal	Desk review on PPR			
	Economic impact at herd and population levels	Risk of introduction of line IV into the country	-	Laboratory accreditation
	Characterization of circulating strains/pathogenicity	-	-	Sero-monitoring
	Early detection, diagnostic and sample collection and transportation	-	-	-
	Field diagnostic/rapid tests	-	-	-
Mali	Desk review on PPR			
	Epidemiology/socioeconomic studies	Modelling and risk mapping	Incentive to vaccination (vaccination + deworming), sensitisation	Laboratory diagnostic (sample collection/ quality of strains), quality assurance in the diagnostic laboratory
	Rapid diagnostic test	-	Thermotolerant vaccine	Manual for vaccinators
Burkina Faso	Desk review on PPR			
	Epidemiology/socioeconomic studies	-	-	Evaluate the performance of the current vaccination strategy
	-	-	-	Sero-monitoring

This was followed by a feedback session to enable discussion and exchange on country priorities. At the end of the session, a brief assessment of participants showed a great satisfaction of all of them towards their expectations. However, it was stressed that the project should engage with stakeholders throughout the project lifespan and beyond. This will be achieved by sharing relevant information including workshop reports and materials and setting periodical meetings with researchers, partners and stakeholders for updates about the project's progress.

Day 3, 27 June 2019: Reviewing and adjusting activities by research groups

During the third day of the workshop, ILRI and core research partners—CIRAD, ISRA, LCV and CIRDES—reviewed the project activities and plans received from stakeholders. The following activities have been agreed for implementation in the three countries.

Activity 1: Surveys (epidemiology and socioeconomics)

This activity will involve epidemiological surveys, economic impacts, animal mobility, gender, cost of vaccination, willingness to vaccinate and to some extent, willingness to pay for vaccination. All countries will be involved and the study design will be worked out depending on country specific production systems, considering transboundary aspects and movement of animals.

Activity 2: Participatory and system dynamic modelling

The aim of this activity is to discuss and codesign surveillance and control strategies with herders at the community level and develop models for ex-ante assessment of control strategies. In addition, CIRAD and ISRA will conduct experimental infection on pathogenicity (see activity 5), which will provide data regarding the force of infection. This data will feed the model of PPR disease spread.

Activity 3: Regional workshops on PPR risk mapping

In order to strengthen the application of the regional PPR eradication plan and in high connection with surveying and modelling activities of the ECo-PPR Project, CIRAD will organize two capacity building workshops in qualitative and cartographic risk analysis. These workshops are dedicated to build a regional approach of PPR risk mapping, which will enable PPR control and eradication process with the identification of areas at high risk.

Activity 4: Molecular epidemiology

During the longitudinal surveys, samples from disease cases will be confirmed using rapid diagnostic tests that will be provided by the project to each country team. The samples will be sent to CIRAD for genomic analysis and molecular epidemiology analysis.

Activity 5: Animal experiments on pathogenicity

This experiment will focus on studying pathogenicity and host pathogen interaction for PPRV strains. A strain of each PPRV lineage circulating in West Africa (I, II and IV) will be included in the study for feature comparison purposes. Animals will be monitored for a short period and their contacts recorded. The data analysis will provide first estimate of characteristics of the virus spread from animal to animal. The experiment will be led by CIRAD together with ISRA in Senegal and will be conducted with support of other ongoing projects optimizing synergies.

Activity 6: Vaccine delivery

This activity aims at exploring models for increasing vaccination coverage through sensitisation of farmers. We will explore how to best implement the interactive voice recording approach (already being considered for the LMIS in Mali) and other sensitisation activities, and evaluate innovation platforms already shown to have improved vaccination coverage in Mali.

Activity 7: Capacity development

Several capacity building activities have been identified by partners and stakeholders. However, specific needs will be addressed depending on countries and context. Among the activities are:

a training on data collection

b seromonitoring

c epidemiology and surveillance training depending on country needs

d manual for vaccinators (to start with Mali only)

e framework analysis of the cost of vaccines

f support to partners to attend international meetings (such as the conference of the PPR Global Research and Expertise Network (GREN) taking place in Nairobi in November 2019)

Conclusions and ways forward

After the consultation with stakeholders, the core research teams ensured coherence between activities and complementarities between countries and discussed study approaches and project coordination.

At the end of the workshop, the participants:

(i) were able to grasp the stakes and challenges of the project in terms of the ability to support countries in the control and eradication of PPR.

(ii) identified possible links between the ECo-PPR project and other research and development projects involving PPR control or eradication activities in the region.

(iii) outlined the road map for the implementation of the research agenda agreed between researchers and stakeholders.

To keep the momentum and ensure engagement of stakeholders throughout the lifespan of the project, a regional workshop will be organized on a yearly basis to discuss achievement and provide further recommendations.

Annexes

Annex 1: Tentative agenda for workshop

Tuesday 25 June 2019 (Planning phase 1): ILRI, CIRAD, ISRA, CIRDES, LCV		
Time	Activity	Facilitator
13:00–13:15	Presentation of participants and planning for the 3-day workshop	Michel Dione
13:15–14 :00	Project presentation (theory of change, outputs, activities and timeline)	Barbara Wieland
14:00–14:30	Coffee break	ILRI
14:30–17:00	Presentation of research options and suggested activities	Facilitator: Barbara Animal mobility and risk analysis (Andrea Apolloni) Economics and vaccine delivery impacts (Abdrahmane Wane and Michel Dione)
18:00–20:00	Group diner	ILRI
Wednesday 26 June 2019 (Workshop launch): refer to agenda below in Annex 2		
Thursday 27 June 2019 (Planning phase 2): ILRI, CIRAD, ISRA, CIRDES, LCV		
8 :30–10 :30	Reviewing and shaping of the activities, formation of technical teams, roles and responsibilities, focal points	ILRI, CIRAD, ISRA, CIRDES, LCV
10:30–11:00	Coffee break	ILRI, CIRAD, ISRA, CIRDES, LCV
11:00–12:30	Activity planning and rough budgeting	all
12:30–13:30	Lunch	ILRI
13:30–14:30	Activity planning and rough budgeting	ILRI, CIRAD, ISRA, CIRDES, LCV
14:30–15:00	Coffee break	ILRI
15:00–17:00	Finalisation of plans and budgets	ILRI, CIRAD

Annex 2: Stakeholder workshop agenda (26 June)

08:00–08:30	Registration of participants	ILRI
08:30–08:45	Welcoming remarks	ILRI Representative in West Africa
08:45–09:00	Introduction of ECo-PPR project	Barbara Wieland, project leader, ILRI
09:00–09:20	Overview of PPR in West Africa	Adama Diallo, CIRAD
09:20–09 :40	Coffee break	ILRI
09:40–10:00	Presentation of animal health component of Projet Régional d'Appui au Pastoralisme dans le Sahel (PRAPS)	Oumar Alfaroukh Idriss, leader, animal health work package of PRAPS project
10:00–10:30	Plenary: questions and discussions	Facilitator
10:30–12:45	Research gaps/priorities (bus stop)	Facilitator for 4 stations – (epidemiology, feasibility of eradication, vaccine, diagnostics and delivery, capacity development and surveillance)
12:45–14:00	Lunch	ILRI
14:00–15:00	Research priorities per country	Facilitator
15:00–15:30	Coffee break	ILRI
	Group feedback on priority areas for research/ Plenary (questions, discussions and ways forward)	Facilitator
17:00–17:30	Closing remarks	ILRI representative in West Africa

Annex 3: Attendance list

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